

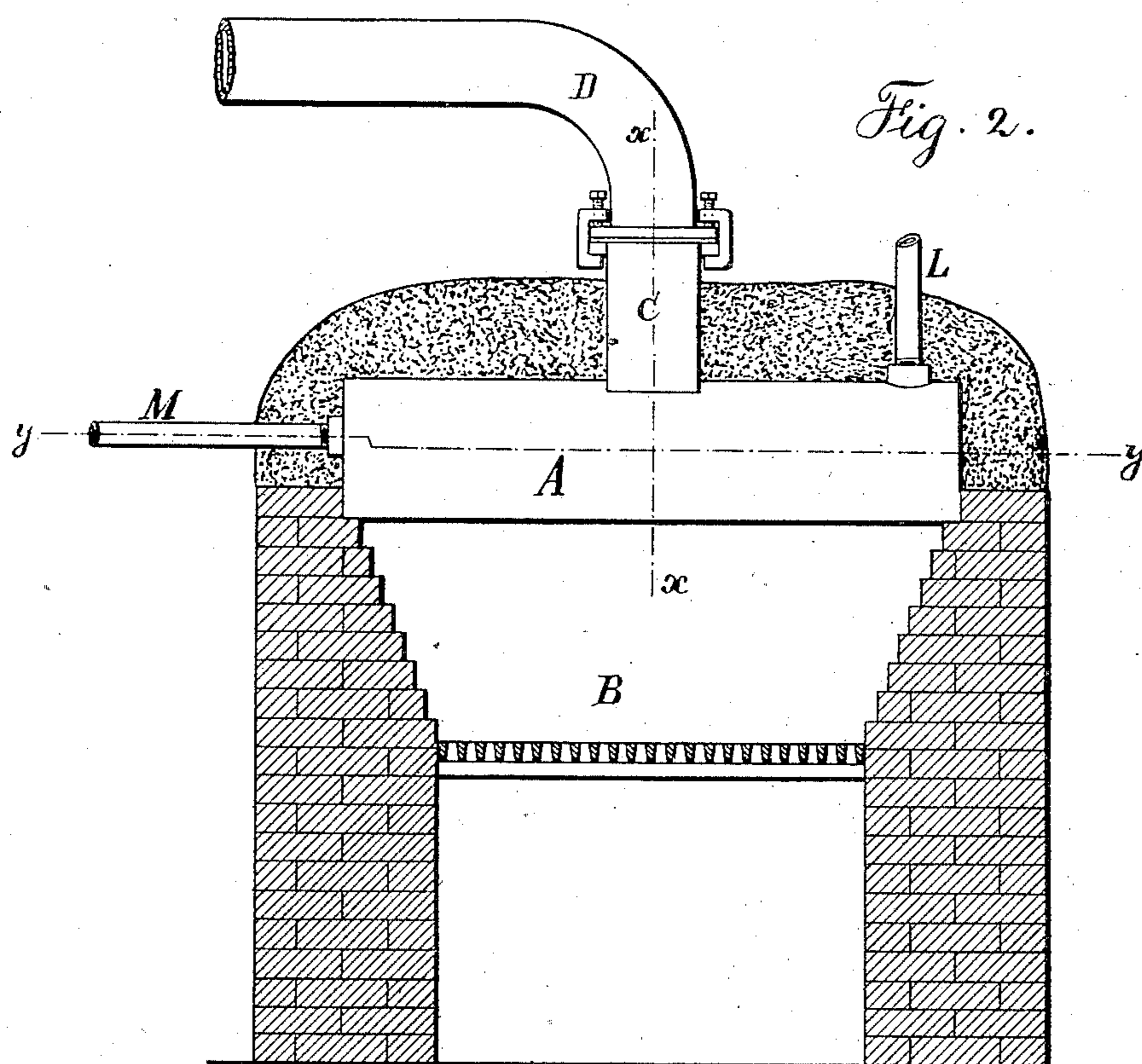
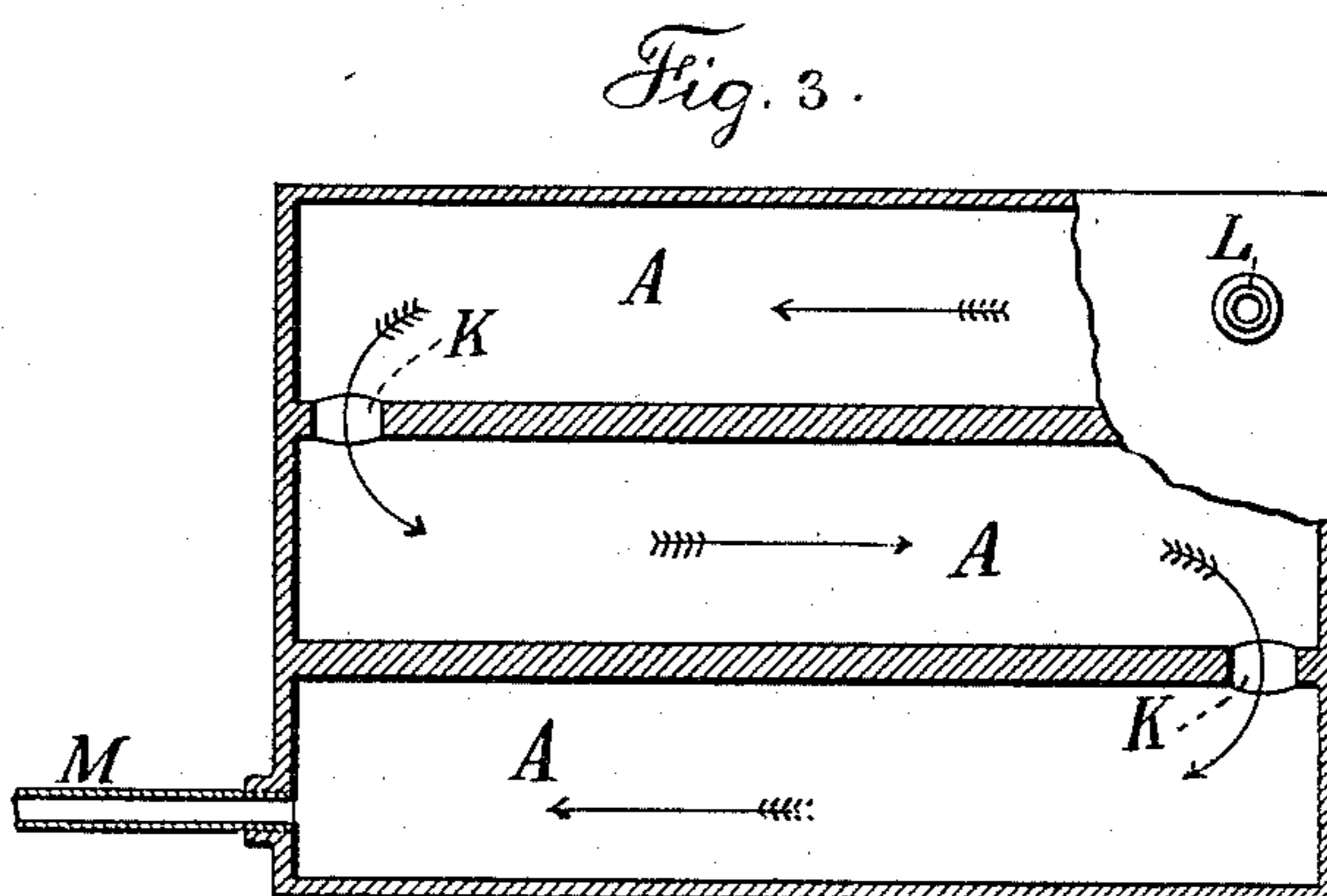
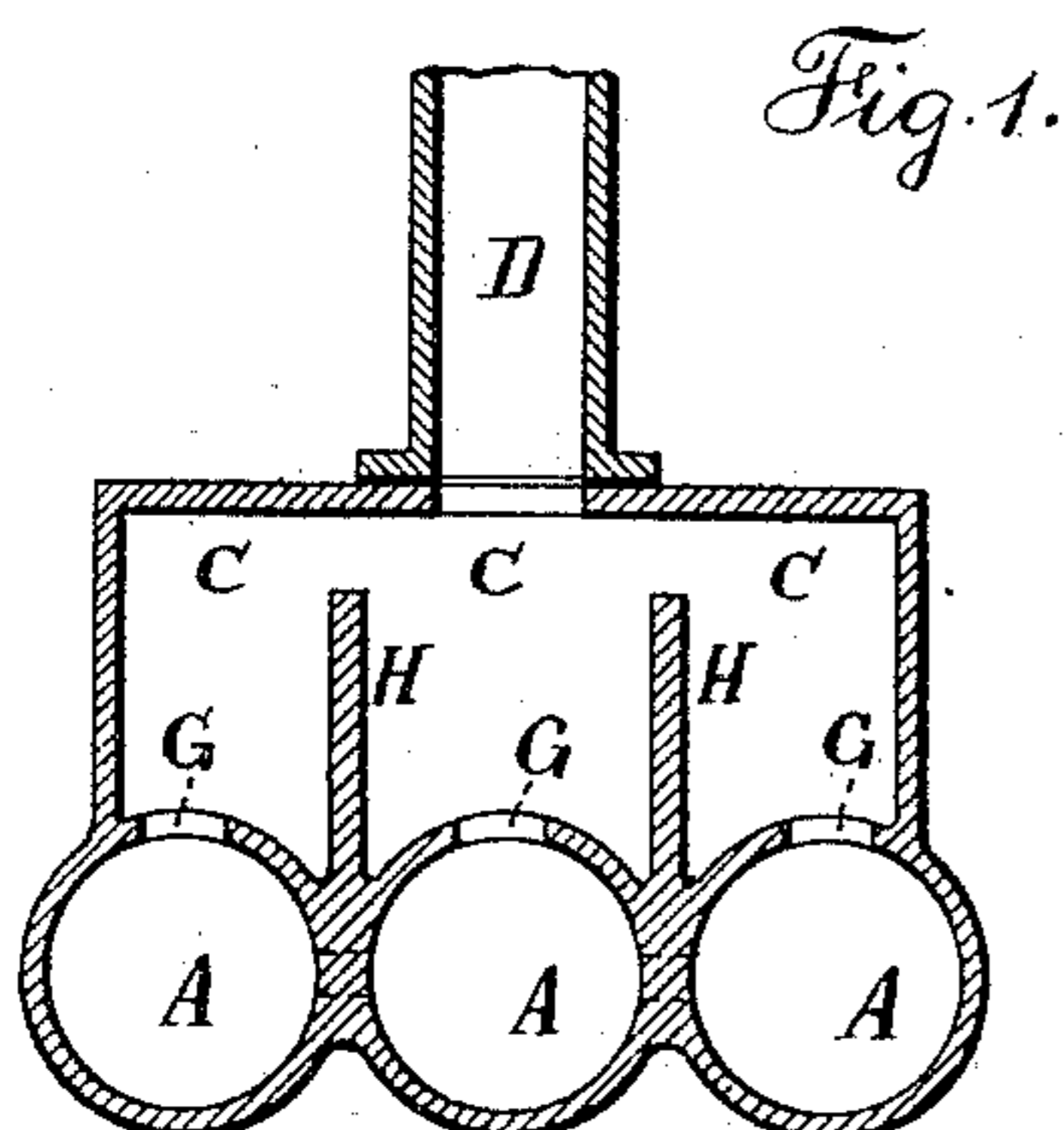
(No Model.)

E. C. NATION.

APPARATUS FOR CONCENTRATING ACIDS.

No. 395,505.

Patented Jan. 1, 1889.



Witnesses:  
J. Stail  
Chas. N. Smith

Inventor:  
Edmund C. Nation  
per Lemuel W. Serrell atty.

# UNITED STATES PATENT OFFICE.

EDMUND C. NATION, OF PASSAIC, ASSIGNOR TO WILLIAM M. JOHNSON, OF  
HACKENSACK, NEW JERSEY.

## APPARATUS FOR CONCENTRATING ACIDS.

SPECIFICATION forming part of Letters Patent No. 395,505, dated January 1, 1889.

Application filed October 25, 1888. Serial No. 289,102. (No model.)

*To all whom it may concern:*

Be it known that I, EDMUND C. NATION, of Passaic, in the county of Passaic and State of New Jersey, have invented an Improvement  
5 in Apparatus for Concentrating Acids, of which the following is a specification.

In the concentration of sulphuric acid it is usual to employ an apparatus composed of platinum. These stills are very expensive,  
10 and it is found in practice that when such stills are used for the concentration of sulphuric acid ranging from eighty per cent. to ninety-eight per cent. the still is rapidly destroyed, involving considerable loss. I find  
15 in practice that a cast iron or steel apparatus constructed in the manner hereinafter described is not injured by highly-concentrated sulphuric acid, because there is not sufficient water present to cause such acid to attack  
20 the iron, especially when such iron is in a heated condition, and I construct the apparatus or still in such a manner that the sulphuric acid or oil of vitriol of commerce can be supplied continuously at one end of the  
25 still, and such concentrated acid is not injured by the presence of the iron, and the cast iron or steel still is very durable, especially when used in the manner hereinafter described.

30 In the drawings, Figure 1 is a cross-section of the still at the line *x x*, Fig. 2. Fig. 2 is an elevation of the still and section of the furnace for heating the same, and Fig. 3 is a sectional plan at the line *y y*.

35 The still is composed of two or more tubes, A. I prefer and use three. These are side by side and cast in one, and there is also a hollow chamber, C, across the middle portions of the tubes A and rising above them,  
40 and within this chamber are the partitions H, that rise up nearly to the top of the chamber, leaving, however, sufficient space for the passage of the vapors, and there are openings in the tops of the respective tubes A A  
45 at G for the free escape of the vapors from the said stills, and there is at the top of the chamber C a connection for the pipe D, through which the escaping gases or vapors

are led to a suitable condenser, and in the partitions between the respective tubes A  
50 are openings K at opposite ends of the still, and the acid to be concentrated is supplied at the pipe L, and the concentrated acid is run off by the pipe M to a suitable vessel in which it is cooled. The still A, partitions H,  
55 and chamber C are all one casting, and for sulphuric acid it is preferable to employ iron or steel, and the stills are placed upon suitable brick-work with the fire-chamber B beneath them, and I prefer to cover the stills  
60 with sand or similar material, which extends up around the chamber C, so that this chamber becomes highly heated, and there is but little loss of heat by radiation, for in practice I find that the sulphuric acid and the  
65 vapors therefrom do not attack the iron when in a heated condition as much as they do when the iron is not heated. It will now be understood that the vapors and gases from the acid within the respective still-tubes  
70 pass off by the openings G into the chamber C, and the acid remains at the same level in the respective still-tubes in consequence of the openings at K; but there is a gradual flow of acid from the inlet L through  
75 the respective still-tubes to the delivery-pipe M, and the acid becomes stronger as it passes along through these still-tubes, and the partitions H prevent the acid foaming over from one still-tube into the other, there-  
80 by insuring a gradual concentration of the acid without the weaker portion of the acid commingling with the more highly-concentrated acid.

I claim as my invention—

85 1. The cast iron or steel still for concentrating acid, composed of two or more tubes, A, chamber C, and partition H, all cast together, there being an opening between one still and the next and openings at the upper portions  
90 of the respective tubes for the passage of the vapors into the chamber C, substantially as set forth.

2. The three still-tubes A, having partitions between them with openings at K, and  
95 the chamber C above the openings G in the

tubes A, and the partitions H, rising within the chamber C, these parts being of iron or steel and cast in one, and an inlet-pipe, L, at one end of one still-tube, and the outlet-pipe  
5 M, for the discharge of the concentrated acid, and a pipe, D, for carrying away the vapors from the still, the same being connected to the top of the chamber C, substantially as set forth.

Signed by me this 22d day of October, 1888. ro  
EDMUND C. NATION.

Witnesses:

GEO. T. PINCKNEY,  
WILLIAM G. MOTT.